(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification[7]:     H04L 27/34

(21) International Application Number:
                                    PCT/US2004/022780

(22) International Filing Date:     15 July 2004 (15.07.2004)

(25) Filing Language:     English

(26) Publication Language:     English
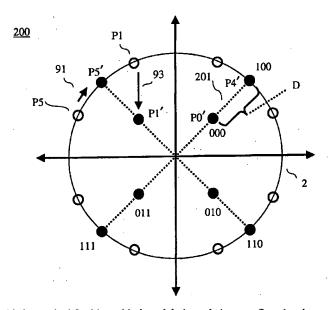
(30) Priority Data:
    60/496,470      20 August 2003 (20.08.2003)     US

(71) Applicant (for all designated States except US): THOM-SON LICENSING S.A. [FR/FR]; 46, Quai A. Le Gallo, F-92648 Boulogne (FR).

(72) Inventors; and
(75) Inventors/Applicants (for US only):     GAO, Wen [CN/US]; 21-21 Quail Ridge Drive, Plainsboro, New Jersey 08536 (US). KOSLOV, Joshua, Lawrence [US/US]; 10 Fairway Drive, Hopewell, New Jersey 08525 (US). RAMASWAMY, Kumar [IN/US]; 71 Sayre Drive, Princeton, New Jersey 08540 (US).

(74) Agents: TRIPOLI, Joseph, S. et al.; c/o Thomson Licensing Inc., 2 Independence Way, Suite 200, Princeton, New Jersey 08540 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(54) Title: METHODS AND APPARATUS FOR HIERARCHICAL MODULATION USING RADIAL CONSTELLATION

(57) Abstract: There is provided a method for hierarchical modulation relating to a first signal, a second signal, and an original constellation having a plurality of symbols in a non-uniform 8 Phase-Shift-Keying (PSK) configuration. Quadrature-Phase-Shift-Keying (QPSK) modulation is used for the first signal and Binary-Phase-Shift-Keying (BPSK) modulation is used for the second signal. The method includes the step of replacing at least some of the plurality of symbols with at least one radial-type QPSK-BPSK constellation.

WO 2005/020530 A1

## WO 2005/020530 A1